

## Biology Toolkit: Indicator 3.1.2

Student Handout: Biology: Indicator 3.1.2

### Goal 3.0 Concepts Of Biology

Expectation 3.1 The student will be able to explain the correlation between the structure and function of biologically important molecules and their relationship to cell processes.

Indicator 3.1.2 The student will be able to discuss factors involved in the regulation of chemical activity as part of a homeostatic mechanism.

Assessment Limits:

osmosis (predicting water flow across a membrane based on the cell's environment; explain role in living systems)

temperature (effect upon enzyme activity and metabolic rate; effect upon rate of diffusion and states of matter)

pH (pH scale: relative values for acids and bases; effect on living systems: cellular, organismal)

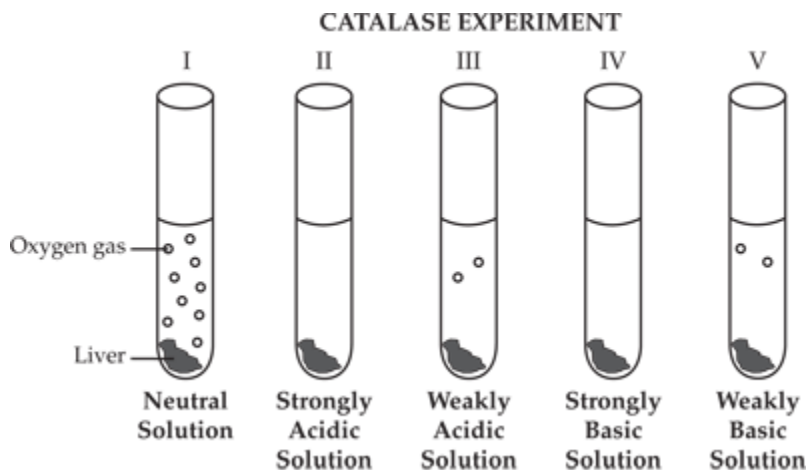
enzyme regulation (effect of temperature, pH, and enzyme/substrate concentration on enzyme activity)

### Public Release - Selected Response Item - Released in 2009

Biology Indicator 3.1.2

Use the information and the diagram below to answer the following item.

Catalase is an enzyme found in the tissues of plants and animals, including humans. Catalase helps prevent a toxic buildup of hydrogen peroxide in cells by breaking it down into water and oxygen gas. Several students conduct an experiment to test the effects of pH on the activity of catalase. Each test tube contains a solution of hydrogen peroxide and water at various pH levels. The liver tissue is a source of catalase. The diagram below represents the results of their experiment.



Based on the students' results, catalase works best at a pH of

- A. 1
- B. 4
- C. 7
- D. 10

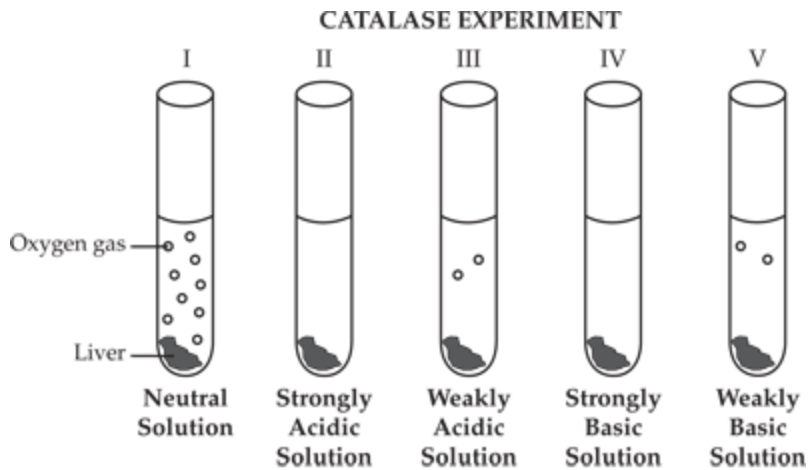
Correct Answer

C. 7

## Item

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